Isolation and characterization of pluripotent human spermatogonial stem cell-derived cells.

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Public Summary:
Here we report the derivation of a stem cell line from male germ cells, spermatogonia. The stem cell line can differentiate to diverse cell types in a dish (in vitro) but showed limited ability to form teratoma tumors in vivo in a mouse model. This suggested some properties in common with embryonic stem cells but also differences that may be important in considering stem cell therapies in the future.

Scientific Abstract:
Several reports have documented the derivation of pluripotent cells (multipotent germline stem cells) from spermatogonial stem cells obtained from the adult mouse testis. These spermatogonia-derived stem cells express embryonic stem cell markers and differentiate to the three primary germ layers, as well as the germline. Data indicate that derivation may involve reprogramming of endogenous spermatogonia in culture. Here, we report the derivation of human multipotent germline stem cells (hMGSCs) from a testis biopsy. The cells express distinct markers of pluripotency, form embryoid bodies that contain derivatives of all three germ layers, maintain a normal XY karyotype, are hypomethylated at the H19 locus, and express high levels of telomerase. Teratoma assays indicate the presence of human cells 8 weeks post-transplantation but limited teratoma formation. Thus, these data suggest the potential to derive pluripotent cells from human testis biopsies but indicate a need for novel strategies to optimize hMGSC culture conditions and reprogramming.